



Perceived impact of smaller compared with larger-sized bottles of sugar-sweetened beverages on consumption: A qualitative analysis



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ABSTRACT

Sugar-sweetened beverage (SSB) consumption increases obesity risk and is linked to adverse health consequences. Large packages increase food consumption, but most evidence comes from studies comparing larger with standard packages, resulting in uncertainty regarding the impact of smaller packages. There is also little research on beverages. This qualitative study explores the experiences of consuming cola from smaller compared with larger bottles, to inform intervention strategies.

Sixteen households in Cambridge, England, participating in a feasibility study assessing the impact of bottle size on in-home SSB consumption, received a set amount of cola each week for four weeks in one of four bottle sizes: 1500 ml, 1000 ml, 500 ml, or 250 ml, in random order. At the study end, household representatives were interviewed about their experiences of using each bottle, including perceptions of i) consumption level; ii) consumption-related behaviours; and iii) factors affecting consumption. Interviews were semi-structured and data analysed using the Framework approach. The present analysis focuses specifically on experiences relating to use of the smaller bottles.

The smallest bottles were described as increasing drinking frequency and encouraging consumption of numerous bottles in succession. Factors described as facilitating their consumption were: i) convenience and portability; ii) greater numbers of bottles available, which hindered consumption monitoring and control; iii) perceived insufficient quantity per bottle; and iv) positive attitudes. In a minority of cases the smallest bottles were perceived to have reduced consumption, but this was related to practical issues with the bottles that resulted in dislike.

The perception of greater consumption and qualitative reports of drinking habits associated with the smallest bottles raise the possibility that the 'portion size effect' has a lower threshold, beyond which smaller portions and packages may increase consumption. This reinforces the need for empirical evidence to assess the in-home impact of smaller bottles on SSB consumption.

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1. Introduction

Excess intake of free sugars (i.e. all mono- and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrup and fruit juices (WHO, 2002)) contributes to the development of non-communicable and dental diseases (Sheiham & James, 2014; Te Morenga, Mallard, & Mann,

2013). Such concerns have led the World Health Organization (WHO) to advise limiting their consumption to less than 10% of total daily energy intake, with reductions below 5% highlighted as having additional health benefits (WHO, 2014) (WHO, 2014). In the UK, the Scientific Advisory Committee on Nutrition has also recommended population intake does not exceed 5% of total energy intake (SACN, 2015). Consumption, however, among both adults and children of developed countries, including the UK, exceeds recommendations (Azaïs-Braesco, Sluik, Maillot, Kok, & Moreno, 2017). The latest data from the National Diet and Nutrition Survey show that in the UK, free sugars contribute on average around 12% of energy intake (12.2% in preschool children, 13.4% in 4–10 year-olds, 15.2% in 11–18 year-olds, 12.3% in adults aged 19–64 years

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and 11.1% in older adults aged 65 years and over) (Public Health England, 2016).

One of larger sources of free sugars in the diet is sugar-sweetened beverages (SSBs) (Azaïs-Braesco et al., 2017; Guthrie & Morton, 2000). SSBs are consumed widely around the world (Singh et al., 2015), including in the UK and USA. In the UK, they contribute approximately 15% of free sugar intake in adults, 16% in children of all ages and as high as 26% in children aged 11–18 years (Public Health England, 2016). A 500 ml bottle of SSB typically contains approximately 55 g (i.e. 13 teaspoons) of sugar and provides approximately 200 calories. SSB consumption increases total daily energy intake (Ng, Ni Mhurchu, Jebb, & Popkin, 2012; Reedy & Krebs-Smith, 2010; Wang, Bleich, & Gortmaker, 2008) and has been linked to weight gain and the development of obesity (Hu & Malik, 2010; Malik, Popkin, Bray, Després, & Hu, 2010; Malik, Schulze, & Hu, 2006), metabolic syndrome and diabetes (Hu & Malik, 2010; Malik, Popkin, Bray, Després, & Hu, 2010; Malik, Popkin, Bray, Després, Willett, et al., 2010) hypertension (Cohen, Curhan, & Forman, 2012), dental diseases (Mishra & Mishra, 2011) and other adverse health consequences. SSB intake may also contribute to observed inequalities in health, given greater consumption amongst the most deprived households (Han & Powell, 2013; Kantar Worldpanel, 2010; Lobstein, 2014; Pabayo, Spence, Cutumisu, Casey, & Storey, 2012).

Given the contribution of free sugars, especially from SSBs, to the rise in chronic disease, curbing their intake has been identified as a priority for public health action (Scientific Advisory Committee on Nutrition, 2014; WHO, 2014). Reducing the size of containers in which SSBs are available is one possible intervention. In the USA, a recent attempt to regulate the size of products in order to reduce their consumption comprised a ban on the sale of sugary drinks larger than 16 oz (473 ml) in many out-of-home settings (Hsiao & Wang, 2013). Although the proposal was rejected, simulation studies suggest that such a restriction could have favourable effects on consumption (Elbel, Cantor, & Mijanovich, 2012; Wang & Vine, 2013). In England, there are examples of companies reducing the sugar content and/or portion sizes of sugary drinks as part of their voluntary pledges under the government's Public Health Responsibility Deal (<https://responsibilitydeal.dh.gov.uk/about/>) but the impact of such initiatives on consumption have yet to be systematically evaluated. A recent Cochrane systematic review found that exposure to large portions and packages increases the consumption of food and non-alcoholic drinks (Hollands et al., 2015), a phenomenon termed the 'portion size effect'. This finding implies that smaller packages, including smaller-sized bottles of SSB, could help reduce consumption. The evidence for this effect, however, is based mostly on studies targeting food products and on comparisons between larger and standard packages, rather than smaller and standard packages, resulting in uncertainty regarding the generalisability of findings to beverage consumption and the impact of smaller packages on consumption (Hollands et al., 2015).

Exposure to smaller packages might reduce consumption, potentially by making additional intake of a product more effortful (Hollands et al., 2015) or as a result of individuals' tendency to consume a specific number of product units in any one episode of consumption regardless of unit size, referred to as the 'unit bias heuristic' (Geier, Rozin, & Doros, 2006). If, for example, people always choose one bottle of SSB whether large or small, they should consume less with smaller bottles. It is also possible, however, that the 'portion size' effect has a lower size threshold – currently unknown, due to the aforementioned lack of evidence for comparisons between smaller and standard packages – below which packages might increase rather than decrease consumption (Marteau, Hollands, Shemilt, & Jebb, 2015). This threshold is likely

to depend on perceptions of appropriate portion sizes, which in turn are influenced by individuals' personal and social norms about what constitutes a suitable amount to consume. As larger portions and packages have become more prevalent and normalised, smaller portions might be considered less appropriate (Wansink & Van Ittersum, 2007) and thus increase intake by encouraging consumption of multiple packages during a consumption episode, entice non-consumers to partake, and if offered in bulk, increase the frequency of consumption (Benton, 2015; do Vale, Pieters, & Zeelenberg, 2008; Holden & Zlatevska, 2015; Hollands et al., 2015; Marteau et al., 2015; Scott, Nowlis, Mandel, & Morales, 2008).

From the above, it is clear that the extant evidence does not allow for confident predictions to be made regarding the impact of smaller bottles of sugar-sweetened beverages on consumption. Given this uncertainty, exploratory, qualitative research can help to inform the discussion, by focusing on consumer perceptions, which may identify putative mechanisms that would not necessarily be revealed by quantitative research. The specific aim of the present study is to explore consumers' experiences of drinking cola from small bottles compared with larger bottles, with the aim of informing future intervention strategies.

2. Methods

2.1. Design

This is a qualitative study based on semi-structured interviews. Semi-structured interviews were chosen as they provide a consistent framework to explore known issues, while at the same time allowing flexibility to the interview process and exploration of topical trajectories in the conversation. This results in collection of reliable, comparable in-depth data relating to the personal experiences of each participant (Cohen & Crabtree, 2006). This qualitative study was conducted as part of a study assessing the feasibility and acceptability of the procedures of a planned large-scale randomised controlled trial evaluating the impact of different bottle sizes on in-home consumption of SSBs (Mantzari, Hollands, Pechey, Jebb, & Marteau, 2015; Mantzari, Hollands, Pechey, Jebb, & Marteau, 2017).

2.2. Participants

Sixteen participants completed this qualitative study. They consisted of household representatives of the sixteen households that completed the aforementioned feasibility study. They were recruited to represent their households, by being the main contact for the feasibility study and provide all necessary data. Their mean age was 33 years (range 19–47 years) and 75% were female. The demographic characteristics of the households from which the participants of the present study were recruited can be seen in Table 1.

The households taking part in the feasibility study were randomly selected from a sample of 37 households in Cambridge, England, which:

- purchased at least 2 L of regular (i.e. not low in sugar) cola drinks per week
- had completed a one-week run in period of the feasibility study, during which they received a range of differently sized bottled drinks to store and consume freely
- expressed a willingness to continue participating in the intervention phases of the feasibility study

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